

believes he has shown that a doubling of the pulse rate, as well as a gradual increase in the size of the interpolated wave (as in Hoffmann's curves at the onset of an attack), may be produced by extrasystoles. He lays emphasis upon the tendency to the production of extrasystoles just before and after an attack of paroxysmal tachycardia.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

JOHN REEA BARTON PROFESSOR OF SURGERY IN THE UNIVERSITY OF PENNSYLVANIA;
SURGEON TO THE UNIVERSITY HOSPITAL,

AND

T. TURNER THOMAS, M.D.,

ASSISTANT SURGEON TO THE UNIVERSITY AND PHILADELPHIA HOSPITALS, AND ASSISTANT
INSTRUCTOR IN SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Scopolamine-morphine as an Adjuvant in the Administration of General Anæsthesia.—SEELIG (*Annals of Surgery*, August, 1905) presents a series of 65 general anæsthesia administrations by this method to show that it merits recommendation and trial. The operations invaded the abdomen, cranium, neck, and rectum. In every instance the patient received a hypodermic injection of scopolamine hydrobromate gr. $\frac{1}{16}$, of morphine gr. $\frac{1}{4}$, one-half hour before the administration of the general anæsthetic, which was induced by the ethyl chloride-ether sequence. The Bennet inhaler, with a slight modification for the administration of the ethyl chloride, was employed for the general anæsthesia.

Scopolamine is an alkaloid from the *hyoscyamus niger*. Its sister alkaloids are hyoscyne, daturine, duboisine, atropine, and hyoscyamine. By some authorities it is claimed that scopolamine is closely allied to hyoscyne; by others that the two are identical, while Ladenburg claims that hyoscyne and scopolamine are by no means identical.

Kochman states that there has never been a death from scopolamine. By the method of administration and dosage worked out by Korff, three doses are given, at three, one, and one-half hours before operation. Rational objections have been made to the fixed dosage. Three deaths have occurred.

Seelig is enthusiastic in its praise. Of his 65 cases, only 1 vomited or retched while on the operating table; 77 per cent. did not vomit at all. One-third of the cases that did vomit, vomited only once, and then only from 2 drachms to 1 ounce of clear mucus. Nausea was never pronounced, except in 2 cases, and vomiting never occurred earlier than two hours after the operation. Laryngeal sensibility was intact by that time and acted as a complete safeguard against tracheal inspiration, and the consequent danger of aspiration pneumonia. Besides decreasing the tendency to vomit, it lessened the quantity of the anæsthetic necessary, only 4 ounces per hour at operation being required.

By the administration of scopolamine-morphine the patients go under and come out from the influence of the general anæsthetic without passing through the usual stages of excitement. Salivation is almost invariably absent. Much less pain is experienced by the patient in the first twenty-four hours after operation. These advantages have been confirmed by Tuffier, Israel, Dork, and Robertson (Robertson used hyoscine instead of scopolamine). Morphine lessens the afferent nerve impulses, reaching the vasomotor centres, and thereby lessens shock (Crile). Scopolamine raises the blood pressure and thereby aids in preventing shock. The consensus of opinion is that many of the irregularities in the action of scopolamine are referable to impure preparations of the drug. Merck's scopolamine is the best preparation of the drug.

✓ **Scopolamine-morphine Anæsthesia.**—RIES (*Annals of Surgery*, August, 1905) says that the greatest difficulty has been found in determining the best proportion of the two drugs to employ. Too much morphine will affect the heart dangerously, while too much scopolamine produces a state of excitement similar to that following atropine poisoning. The patients become restless and talk as if in a delirium. The pupils are widely dilated and rigid and the face is flushed. They demand water constantly and complain of dryness; but the dryness soon wears off, and neither in man nor in dogs have any cases become known where scopolamine alone has produced death.

Scopolamine-morphine is used for two purposes: First, with the intention of performing the whole operation under this anæsthesia alone; secondly, as a preliminary to anæsthesia by inhalation of chloroform or ether. If the case is a complete success the patient becomes sleepy after the first injection, is fast asleep after the second, and is unconscious and insensible to pain after the third. The operation may begin one-half hour after the last injection.

According to Ries' experience, the sleep may be so slight that the patient awakes when spoken to or moved. Some, if aroused, cannot answer intelligently, but mumble a few unconnected words. Others again, though they cannot be aroused, move when being handled, or even complain. It then becomes necessary to add some other anæsthetic to the scopolamine-morphine. Ries has, in a number of cases, added infiltration anæsthesia with a 0.06 per cent. salt solution without cocaine, to the complete exclusion of chloroform. When chloroform is given very little is required, and in many cases after the first few drops have been given for the first incision no more chloroform is necessary, so that operations lasting fifteen to thirty minutes can be finished with less than a teaspoonful of chloroform. Complete muscular relaxation does not, as a rule, result.

Ries has used scopolamine-morphine on 72 patients in 92 operations. Of the 72 patients, 3 died. In none could the scopolamine-morphine be accused. Of the deaths reported as due to it, only 1, in Ries' opinion, seemed to be due to the scopolamine-morphine. He has used hyoscine instead of the scopolamine, and with both had the same result.

Scopolamine, when dissolved in water, does not keep long, and it has been Ries' rule to have a new solution made every week. Even then it was noticed that the effect of the drug would decrease toward the end of the week, so that in the future he will have a new solution made every three days.